Use Of Picloram To Obtain ROOTkill Of Unwanted Woody Plants, In Practicable Rightofway Vegetation Management, 1983*.

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In 1983, the use of picloram was continued. Dow's Tordon RTU was used, containing 5.4% picloram (triisopropanolamine salt of 4-amino-3-5-6 trichloropicolinic acid, with 20.9% of a comparable salt of 2,4-D) diluted with equal parts of water. Picloram is said to "translocate" within the plant. The mixture was specifically applied to 55,667 stubs of the same 97 species of woody plants (including a few critical herbaceous species) as in 1982, occuring on 25 acres researched since 1925, and used since 1946 for the development of relatively stable (i.e. non-successional) shrubby and herbaceous plant-communities, within a beech-birch-maple-hemlock Vegetation Zone. The technique of application is completely stub-specific, with woody stubs up to 8 cm. in diameter. (Low stumps of larger trees are known to be rootkilled by picloram application). Stubs 2-10 cm. in dm. are sawed with a small folding saw. Stubs under 2 cm. (often bent over by stepping on them) are cut with an anvil-blade pruning shears held in the right hand, and sprayed with a 1½ pint or a 3½ pint plastic garden sprayer, held in the other hand. The saw is also used to chafe the bark, and expose the cambium close to the ground, with downward strokes. A small hatchet is sometimes used for "cups" or "frills", and the injuries are then sprayed. Approximately four gallons of Tordon RTU were used, now selling at $28.16 a gallon. It took 242 hours actually to spray the 55,667 stubs. Trees and shrubs are cut at varying heights, and varying percentages of the branches and shrub-stems were cut to seek economically the most efficient technique for root-killing. No attempt was made - considering the highly varying state of nature itself - to quantify categorized data for mathematical operations. Such methodologies are inappropriate. By the end of 1983, the following operations can be made, verifying and supplementing those made in 1982.

In general, for all species, picloram is a more efficient root-killer than the older chlorophenoxies 2,4-D and 2,4,5-T. As with the chlorophenoxies, by far the major part of the translocation is UP (conspicuously killing the top foliage, which then often adheres to the top branches in early winter, and is called "kill" by many engineers, "control" by other engineers).

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Tordon INEFFICIENTLY moves DOWN, to kill the roots, which is the objective of the honest Vegetation Manager. Picloram does pass readily thru the roots on some clonal species (on its way UP to adjacent stems) such as Bristly Locust and Trembling Aspen, killing ramets up to 2 m. distant. Tordon does not seem to move thru the roots of beech, when sucker-stubs are treated.

The terms "control" and "kill" are not used, tho they are popular in the commercial literature. "Control" is the commercial term for a temporary reduction in the population of a weed species. "Kill" inadvertantly refers to visible top-kill, a cosmetic effect, which if it is the only effect, is considered a failure in this study.

No data are presented for "per acre averages". As in all such non-indiscriminate species-oriented operations, the extraordinary variability in the abundance of each species in plant-communities make per-acre data irrelevant.

Inevitably, some spray gets onto the ground, some of which then washes into the soil. If there is movement of the soil solution down slope, picloram is apparently picked UP by other plants, even 15 m. away, with highly injurious results to those plants. i.e. treatment must not be near desirable shrubs and herbs. However, most of these plants recover after 2 years.

In general, cutting higher stubs (waist high to head high) and the cutting of a small percentage of several ground-arising stems from one shrub or tree clump does not lead to effective rootkilling. This treatment was emphasized in 1982, but re-sprouting (tho with small and distorted growth) was considered undesirable.

Saw-scraping near the ground on 5-7 m. high saplings and picloram treatment produces a quick and most conspicuous leaf-kill. Leaves begin to drop or turn color by two days to two weeks, but resprouting the next year, from the base, indicates the frequent failure to rootkill.

When resprouting occurs in a second year, it is probable that the plant will recover in a third or fourth year. Even shrubs severely damaged after accidental contamination may send out new and apparently healthy shoots at various heights among the branches in a later year. (There is no field evidence yet, that picloram is released from decaying roots, causing delayed damaging effects.)

There is NO evidence that any individual woody plants develop an immunity or resistance to picloram, allowing them to become more abundant in the future. Any resurgence is simply due to the original failure to rootkill. Mice and deer may then "control" these shoots, depending on the abundance of the animals. The apparent

increase of such plants as oaks, ashes and maples on transmission lines is simply the iatrogenic effect of a quarter-century of never rootkilling these plants, together with additional invasion of such woody plants in the bare spots left by killing the non-target plant species.

The bulk of the unwanted woody plants in the research areas of A.F. are "old" plants, there for 5-50 years or more, unkilled by past chemical treatments, and variably controlled by herbivores. Successful new invasion of trees and shrubs into herbland is a variable and unpredictable complex phenomenon, occurring at intervals of decades. There is essentially no invasion into pure stands of most shrubs and ferns, and a few herbs.

Heaviest new invasion of unwanted woody plants is clearly at the sides of the fields, within 15 m. of the forest edge, and dependent even there on the coincidence of seed trees in that edge. On the other hand, if the 15-m.-wide edge is dominated by certain pure low stands of such as Hayscented Fern, Low Juniper, Rough-stemmed Goldenrod, there is no such invasion, even if clearly in the seed-fall shadow and leaf-fall shadow of large trees. (These plants are often destroyed by unreasonable R/W management practices.)

The trees most easily root-killed, even by stubbing at heights of 1½ to 2 m., are the Birches, White, Gray, Yellow and Black. Red Maple, the most abundant single species in these tests, and Red Oak, are usually rootkilled if all stubs are cut and treated within 15 cm. of the ground. White Ash, with its massive tap root, should be treated close to where the "root collar" is, but since a seedling-stem is often flattened by falling grass in autumn (to grow upward from the tip, leaving a horizontal stem section up to 30 cm. long, itself developing adventitious roots), effective stub-application is a problem. It may be wise to ring and rootkill the fruiting large ash from which the seedlings came.

The search for a yet cheaper and more efficient mode of chemically rootkilling unwanted woody plants in R/Ws continues, even while the undesirability of indiscriminate blanket herbicidal spraying - killing many highly desirable non-target species - becomes more and more obvious.

The "end-product" of this technique of rootkilling of unwanted woody plants that had invaded long ago, leaving relatively stable permissible plant-communities, has been essentially accomplished at Aton Forest. This research was begun in 1946. The scientific description of such stable Vegetation types will take increasing precedence in future botanical research reports.